

C) Complete each of the following:

(5 Marks)

- i) The number average molecular weight: $M_n = \dots\dots\dots$
- ii) The weight average molecular weight: $M_w = \dots\dots\dots$
- iii) The colloidal ion of hydrous ferric oxide as $= \dots\dots\dots$
- iv) The dispersed soap in water produces $\dots\dots\dots$, while in alcohol $\dots\dots\dots$
- v) Dialysis is a process of $\dots\dots\dots$ a dissolved substance.

D) Show by equations, how you can calculate:

(5 Marks)

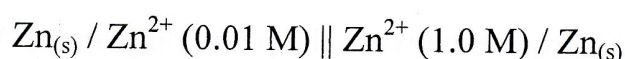
- i) The actual dimensions of single particle.
- ii) The mass of the single particle (m) and molar weight (M) of the dispersed phase.

III) Answer the following questions:

(16 Marks)

A) Consider the following galvanic cell:

(5 Marks)

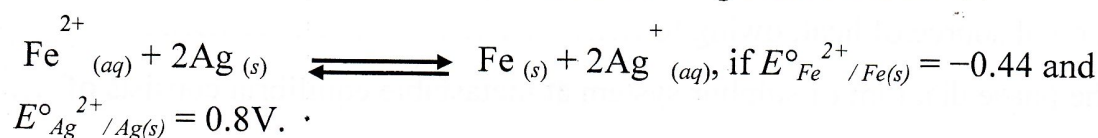


- i) What is the type of this cell?
- ii) Calculate the cell potential at 25 °C, if $E^\circ_{\text{Zn}^{2+}/\text{Zn}(s)} = -0.76 \text{ V}$, $R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$, $F = 96500 \text{ J/V. mol}$.

B) i) Compare between galvanic and electrolytic cells.

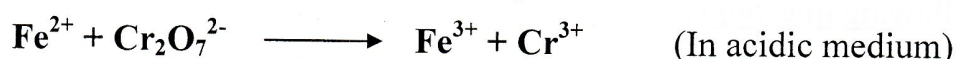
(5 Marks)

ii) What is the equilibrium constant for the following reaction at 25 °C?



C) Complete and balance the following equation:

(3 Marks)



D) Write briefly with drawing on Only one of the following:

(3 Marks)

- i) standard hydrogen electrode
- ii) Lead storage battery

Good Luck,,,

Examiners: Prof. Dr. Maher M. A. Hamed

Prof. Dr. Seddique M. Ahmed

Dr. Mohamed Kotb



The Final Physical Chemistry II (C-232) Examination for Second Level Students

Answer all the following questions (I, II, III)

I) Answer the following questions: (17 Marks)

A) Explain briefly **Only two** from the following: (10 Marks)

- i) Sodium sulphate – water system.
- ii) Ferric chloride – water system and its uses as a good freezing mixture.
- iii) The ternary system $\text{NH}_4\text{NO}_3 - \text{AgNO}_3 - \text{H}_2\text{O}$ at 30°C , where the congruently binary compound is formed.

B) What are the main differences between the phase diagram of Ag – Pb system and that of KI – water system? (4 Marks)

C) Complete each of the following: (3 Marks)

- i) In order to define a three component system completely, variable are required namely,
- ii) The addition of salt to ice results in considerable lowering of temperature if there is no external source of heat, owing to
- iii) The phase diagram of sulphur system at metastable equilibria consists of areas, curves and triple points.

II) Answer the following questions: (17 Marks)

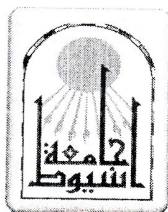
A) Discuss **Only two** methods for the preparation of sols from the following: (4 Marks)

- i) Condensation methods ii) Change of solvent iii) Dispersion method

B) Choose the correct answer for each of the following: (3 Marks)

- i) The reason for the stability of lyophobic colloids is their
a) miscible b) stable c) electric charge d) electrolyte
- ii) The lyophilic sols are sols.
a) stable b) true c) reversible d) turbid
- iii) The lyophobic need for their preparation.
a) heating b) cooling c) electric power d) stabilizing agents

Please turn over,,,



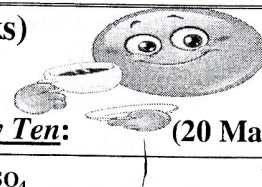
Final Examination of Organic Chemistry II (212C) for Credited Hours Students

Answer the following questions:

(50 Marks)

First question:

Give the chemical structure of the following reactants completing their equations, Only Ten: (20 Marks)



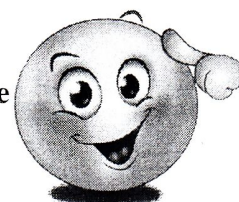
(1) Benzene diazonium salt	$\xrightarrow[\text{water}]{\Delta}$	.....	$\xrightarrow{\text{Br}_2/\text{AlCl}_3}$	.....	$\xrightarrow{\text{HNO}_3/\text{H}_2\text{SO}_4}$	.....
(2) Toluene	$\xrightarrow{\text{Cl}_2/h\nu}$	.....	$\xrightarrow{\text{NaOH}}$	.....	$\xrightarrow{\text{Cl}_2/\text{AlCl}_3}$	.....
(3) Nitrobenzene	$\xrightarrow{\text{Zn}/\text{NH}_4\text{Cl}}$	.....	$\xrightarrow{\text{H}^+}$	.....	$\xrightarrow{\text{Cl}_2/\text{AlCl}_3}$	.....
(4) Toluene-2-sulfonic acid	$\xrightarrow{\text{PCl}_5}$	.....	$\xrightarrow{\text{NH}_3}$	.....	$\xrightarrow{\text{KMnO}_4}$	.....
(5) Thiophene	$\xrightarrow[\text{SnCl}_4]{\text{CH}_3\text{COCl}}$	.....	$\xrightarrow{\text{Benzaldehyde}}$	.....	$\xrightarrow{\text{acetyl nitrate}}$	.....
(6) Phenyl hydrazine	$\xrightarrow[\text{AcOH}]{\text{Acetophenone}}$	.....	$\xrightarrow[\text{(ii) H}_2\text{O}]{\text{(i) POCl}_3/\text{DMF}}$	.....	$\xrightarrow[\text{NaOH}]{\text{CH}_3\text{NO}_2}$	.....
(7) Chloro acetone	$\xrightarrow{\text{Thioacetamide}}$	.....	$\xrightarrow{\text{n-Butyl lithium}}$	.....	$\xrightarrow{\text{CH}_3\text{I}}$	.....
(8) Acetyl aceto acetate	$\xrightarrow{\text{phenyl hydrazine}}$	.....	$\xrightarrow{\text{Br}_2}$	.....	$\xrightarrow{\text{H}_3\text{O}^+}$	.....
(9) Pyridine	$\xrightarrow{\text{H}_2\text{O}_2/\text{AcOH}}$	.....	$\xrightarrow[\text{H}_2\text{SO}_4]{\text{HNO}_3}$	.....	$\xrightarrow{\text{POCl}_3}$	.....
(10) 2-Chloropyridine	$\xrightarrow{\text{NaN}_3}$	.....	$\xrightarrow{\text{EtOOC}\equiv\text{COOEt}}$	.....	$\xrightarrow{\text{NH}_2\text{NH}_2}$	.....
(11) P-Toluidine	$\xrightarrow[\text{PhNO}_2]{\text{Glycerol}/\text{H}_2\text{SO}_4}$	.....	$\xrightarrow{\text{HNO}_3/\text{H}_2\text{SO}_4}$	.....	$\xrightarrow[\text{(ii) H}_2\text{O}]{\text{(i) NaNH}_2}$	.....

Second question:

(a) Give the reason Only Five of the following, By Equations:

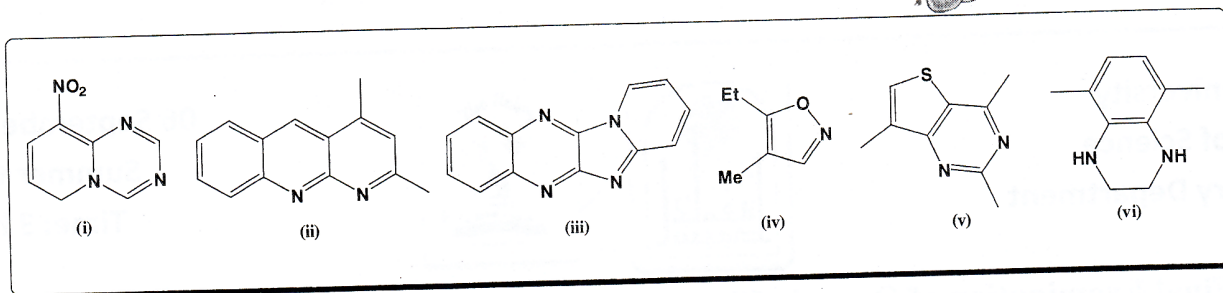
5 Marks

- (1) Friedel-Crafts acylation is better than Friedel-Crafts alkylation for synthesizing alkylbenzene.
- (2) Importance of adjusting the pH in the reduction on nitrobenzene.
- (3) Halogens are deactivating and *ortho/para* directors in electrophilic substitution reactions.
- (4) Nitration of imidazole is difficult and give mainly 4-nitroimidazole.
- (5) Electrophilic substitution of pyridine occurs at C3
- (6) Reaction of phenylhydrazine with methyl ethyl ketone gives mainly 2,3-dimethylindole



(b) Give the name of the following compounds, Only Five :

(5 Marks)



Third question:

(a) Arrange the following ascendingly (low to high order) according to the giving property inside the brackets, (4 Marks)

Only Four:

- (1) Phenol, *p*-Nitrophenol, Picric acid, *p*-Cresole
- (2) Aniline, *p*-Ansidine, *p*-toludine, *N,N*-Dimethyl aniline
- (3) Benzene, Thiophene, Pyridine, Furan, Pyrrole
- (4) Chlorobenzen, Picryl chloride, 2,4-Dinitrochlorobenzene
- (5) Prrrole, Thiophene, Furan, *N*-Methyl pyrrole

(Acidity)

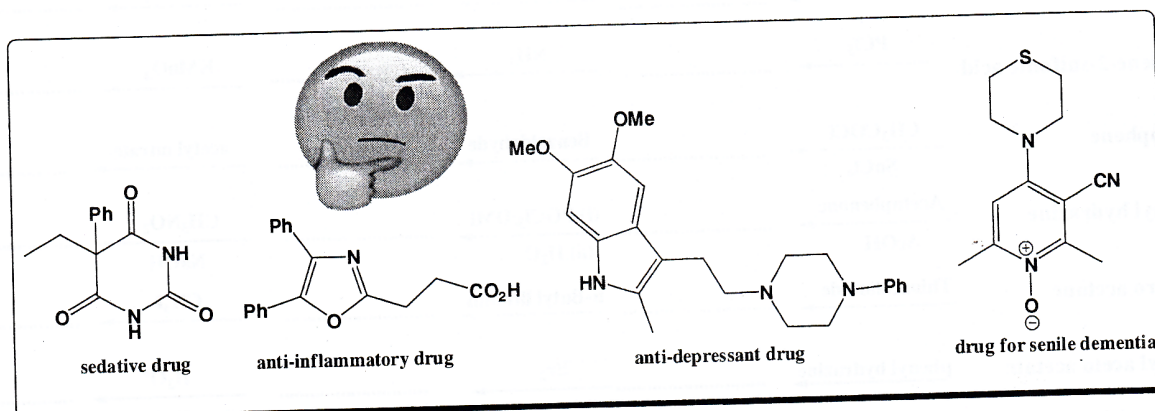
(Basicity)

(Electrophilic substitution)

(Nucleophilic substitution)

(Aromaticity)

(b) Show, by equations, how retosynthesis strategy can be used for synthesizing the following drugs, Only Three? (6 Marks)



Fourth question:

(a) How can execute Only Four of the following (By equations):

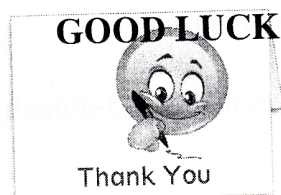
(4 Marks)

- (1) Separate *m*-xylene from its isomers by sulfonation and desulfonation technique.
- (2) Conversion of aniline to *o*-nitroaniline.
- (3) Conversion of phenol to salicylaldehyde and salicylic acid by Reimer Tiemann reaction
- (4) Increasing the reactivity of pyridine towards electrophiles
- (5) Nitration and sulphonation of pyrrole.

(b) How, by equations can you prepare from Benzene the following compounds, Only Three?

(6 Marks)

- (1) Saccharin
- (2) Indigotin
- (3) *p*-chlorobenzoic acid
- (4) *m*-nitrobenzonitrile



Examiner: Dr. Awad Said

2/2

22/08/2018

الامتحان من صفحتين



Answer on the following questions:

(50 Marks)

1) Answer two only of the following :

(2x5 = 10 Marks)

- Deduce the series of steps by which reactive hydrocarbons is oxidized when it is released into an atmosphere undergoing a photochemical smog process.
- Deduce the series of steps by which ibuprofen is synthesized as green product.
- Define the following terms:
Persistent Organic Pollutants (POPs) - Nuclei mode - Dobson unit.

2) Answer two only of the following:

(2x5 = 10 Marks)

- Discuss the Conversion of methane to carbon dioxide in atmosphere.
- Describe the reactions responsible for the ozone hole.
- Show by equations the chemical mechanisms by which different catalytic process contributing to destruction of ozone in the lower stratosphere over South Pole.

3) Answer two only of the following:

(2x5 = 10 Marks)

- Show by chemical equation the reaction of hydroxyl radical with CO , SO_2 , CH_4 , O_3 , NH_3 and CF_2Cl_2 .
- Describe by equations the synthesis of Thiram & Captan fungicides?
- Show by equations the Dow process for the manufacture of (2, 4-D) and (MCPA)

4) Answer two only of the following questions:

(2x5 = 10 Marks)

- Conversion of pyridine into Diquat and Paraquat.
- Write the chemical structure of the following compounds?
Benomyl - Thiabendazole - Dimethirimol -
Carbofuran - Triclosan - Nicotine.
- Detail the synthesis of DDT insecticides and Chlorosulfuron herbicides?

5) Choose the correct answer of the following:

(1x10 =10 Marks)

i) Green chemistry aims to?

- Design chemical products and process that maximize profits
- Design safer chemical products and processes that reduce or eliminate the use and generation of hazardous substances
- Design chemical products and processes that work most efficiently
- Utilize non-renewable energy

Please see the next page

- ii) Which of the following are among the 12 Principles of Green Chemistry?
- a) Design commercially viable products b) Use only new solvents
 - c) Use catalysts, not stoichiometric reagents d) Re-use waste
- iii) Green chemists reduce risk by?
- a) Reducing the hazard inherent in a chemical product or process
 - b) Minimizing the use of all chemicals
 - c) Inventing technologies that will clean up toxic sites
 - d) Developing recycled products
- iv) Which of the following is a challenge for green chemists?
- a) Awareness of the benefits of green chemistry
 - b) Developing chemicals that are recyclable
 - c) Training for cleaning up chemical spills
 - d) Knowing when to reduce and eliminate hazardous waste
- v) Business benefits of green chemistry include?
- a) Reduced costs associated with waste treatment and disposal
 - b) Innovating 'greener' products to entice customers
 - c) Greater compliance with environmental legislation
 - d) All of the above
- vi) The first listed of the 12 Principles of Green Chemistry is?
- a) Prevent b) Catalysis c) Atom economy d) Benign solvents
- vii) This word is synonymous with green chemistry and also means harmless, or gentle and not life threatening?
- a) Sustainable b) Benign c) User friendly d) Greenness
- viii) Which of the following is the greenest solvent?
- a) Formaldehyde b) Benzene c) Ethanol d) Water
- ix) Environmental benefits of green chemistry include?
- a) Fewer raw materials and natural resources used
 - b) Cleaner production technologies & reduced emissions
 - c) Smaller quantities of hazardous waste to be treated and disposed of
 - d) All of the above
- x) Green chemistry can reduce all but which of the following?
- a) Cost b) Risk & Hazard c) Awareness d) Waste

GOOD LUCK

Prof. Dr. Yasser Elossaily



**Final Examination of Introductory Quantitative Analysis
For 2nd Level Students**

Answer the following questions: (50 Marks)

I- Write (True) or (False) in front of the following statements: (10 Marks)

- 1) In the Mohr method chlorides are first precipitated with excess silver nitrate, then excess silver is titrated with potassium thiocyanate. ()
- 2) Auxochrome is defined as any isolated covalently bonded group responsible for the absorption of light radiation. ()
- 3) Precipitation titrations are particularly useful for determination of a mixture of different metal ions in solution. ()
- 4) A redox indicator is a compound that changes color when it goes from oxidized form to reduced form. ()
- 5) The pK_a value is a number to express the hydrogen ion concentration. ()

II- Sketch only two of the following curves and indicate the suitable indicators:

(7 Marks)

- 1) The determination of weak acid using strong base.
- 2) The determination of strong base using strong acid.
- 3) The determination of weak base using strong acid.

III- Write the balanced oxidation and reduction half reactions for only two of the following:

(10 Marks)

- 1) The determination of $KMnO_4$ using $H_2C_2O_4$. [$C_2O_4^{2-} \longrightarrow CO_2$]
- 2) The determination of $FeSO_4$ using $K_2Cr_2O_7$.
- 3) The determination of NO_2^- using $KMnO_4$. [$NO_2^- \longrightarrow NO_3^-$]

IV- Calculate the pH at zero, 25, 50 and 60 mL titrant in the titration of 50 mL of 0.1 M HCl with 0.1 M NaOH. (8 Marks)

V- Define the following terms:

(5 Marks)

- 1) Back titration
- 2) Blue shift

VI- If you dissolve 1.35 g of $Na_2C_2O_4$ in 150 mL distilled water, calculate the followings:

- A) The concentration of the solution in ppm.
- B) The pH of the solution.

$$[K_{a1} = 5.9 \times 10^{-2}, K_{a2} = 6.4 \times 10^{-5}]$$

(10 Marks)

**Good Luck
Dr. Ahmad Abo Markeb**



Examination of Inorganic and Physical Chemistry C-250 for 2nd Students

Section I (Inorganic Chemistry)

(Mak: 25)

Answer the Following Questions:

I) Write the chemical symbol (Five only)

- i) Gypsum, ii) Borax, iii) Magnesium-bicarbonate, iv) Aluminum hydroxide .n hydrated v) Silicon dioxide, vi) Hydrazine hydrate.

II) Complete and balance (Five only) the Following equations:

- i) $CaCO_3 + CO_2 + H_2O \longleftrightarrow \dots$
ii) $2(O - O)^{2-} + 2CO_{2(g)} \longleftrightarrow \dots + \dots$
iii) ${}_7N^{14} + {}_0n^1 \longleftrightarrow \dots + \dots$
iv) $NaOH + NH_4Cl \longleftrightarrow \dots + \dots$
v) $NaOH + 2[Co(NH_3)_6]Cl_3 \longleftrightarrow \dots + \dots + \dots + \dots$
vi) $BeO + C + Cl_2 \xrightarrow{700^\circ C} \dots + \dots + \dots$

III) I) Draw the chemical structure of the monomeric, dimeric, and polymeric form of beryllium chloride.

ii) Discuss the position of Hydrogen in the periodic Table after Mandelef.

IV) i) Explain be equations the amphotoric character of Beryllium and Aluminum oxide.

II) Discuss by examples the oxidation states of group VIA

V) The hardness of water may be "Temporary or permanent"
Discuss each of these, How is each removed.

See Next page

Section II (Physical Chemistry)

(Mark: 25)

Answer the following questions:

I) Choose the correct answer:

1) The ratio of P1 and P2 correspond to variable T as:

$$\frac{P_1}{P_2} = \dots\dots \quad \text{a) } \frac{H_1}{H_2} \quad \text{b) } \frac{V_1}{V_2} \quad \text{c) } \frac{T_2}{T_1} \quad \text{d) } \frac{T_1}{T_2}$$

2) If the V is keeping constant, then

$$\Delta H = \dots\dots \quad \text{a) } \Delta F^\# \quad \text{b) } q_v \quad \text{c) } \Delta H^\# \quad \text{d) } q_p$$

3) For reversible processing: $q_{irrev} = \dots\dots$ a) $\Delta F^\#$, b) $\Delta G^\#$ c) q_{rev}

4) $\Delta H = \Delta E + \dots\dots$ a) $\Delta F^\#$, b) ΔR , c) $\Delta(PV)$, d) ΔC_p

5) If $\Delta H^\#$ and Q_p are negative, the reaction will be:

a) irreversible b) endothermic c) reversible d) exothermic

II) Complete the Following:

1) Under isothermal expansion of ideal gas: $\Delta S^\# = \dots\dots$

$$2) \frac{dH}{dT} = \frac{\dots}{\dots} + \frac{\dots}{\dots}$$

$$3) \Delta G^\# - \Delta G^{\#0} = \dots\dots$$

$$4) C_p = \dots\dots + \dots\dots$$

$$5) \frac{d \ln K}{dT} = \frac{\dots\dots}{\dots\dots}$$

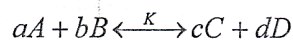
III -a) Show, how can you calculate the work done (W) in each operation,

maximum work ($W_{\max}$), and efficiency (η) during Carnot cycle (Mark:4)

b) Tabulate the conditions for $\eta\% = -100, -50, 0.00, +50, +100$, and ∞

IV) Prove that the equilibrium constant (K) for the chemical reaction

is affected by the change in temperature (T):



VI) When gaseous of Ozone (O_3) is formed from the molecular oxygen by

the reaction: $\frac{3}{2} O_{2(g)} \leftrightarrow O_{3(g)}$ if $\Delta G^{\#0} = +39.1 \text{ kcal.mol}^{-1}$, $R = 1.98 \text{ cal/mol-deg}$

What is the value of K for this reaction at: $T = 250, 300, 350$, and $400.K$

-----Good Luck----- Examiner: Prof. Dr. Seddique M Ahmed

Assuit University Faculty of Science Chemistry Department		Time: 2h Date: January 2019 Course code: C205
Final Exam of Industrial Method of Analysis For 2nd Level Students		

Answer the following questions: (50 Marks)

I- Complete the following: (10 Marks)

- 1) The most common carrier gases of gas chromatography are,, and
- 2) is the conductance of the body of uniform length (l) and uniform cross section area (A).
- 3) The rate of decrease of intensity of monochromatic light with the concentration of the absorbing species is directly proportional to the intensity of the incident light according to Law.
- 4) Increasing the mobile phase polarity in normal phase chromatography elution time.
- 5) The energy required for π - π^* transition is than for σ - σ^* transition.

II- Define the following terms: (10 Marks)

- 1) Hypsochromic shift
- 2) Molar conductance
- 3) ppm
- 4) Hypochromic effect.

III- Discuss only three of the following: (10 Marks)

- 1) Applications of potentiometric titrations.
- 2) Deviations from Beer-Lambert's Law.
- 3) Applications of conductometric titrations.
- 4) The basic components of GC and HPLC instruments.

IV- Sketch only two curves of the following: (10 Marks)

- 1) Conductometric titration of NH_4OH using HCl .
- 2) Conductometric titration of HCl using NaOH .
- 3) Potentiometric Titration curve of CH_3COOH using NaOH .

V- Answer only one of the following: (10 Marks)

- 1) Calculate the pH at zero, 25, 50, and 60 mL titrant in the titration of 50 mL of 0.1 M HCl with 0.1 M NaOH .
- 2) A sample of hexavalent chromium in 1.0 cm cell is determined with a spectrophotometer to give an absorbance of 0.1 at 540 nm. If the absorptivity of the Cr(VI) is $2 \text{ cm}^{-1}\text{g}^{-1}\text{L}$, what is the concentration of Cr(VI) in ppb. (At.Wt. of Cr is 52 g/mol).

<Good Luck>

Dr. Ahmad Abo Markeb

**Final Examination of Introductory Quantitative Analysis (C- 240)
For Second Level Students**

Answer **Four** questions Only:

(12.5 Marks for each question)

- 1)a- Explain the principles of chelation titration indicators.
b- Calculate the ppm concentration of 2.5×10^{-4} M solution of MnO_4^- .
c- 5.0 ml of 0.1 M Ce^{4+} solution is added to 5.0 ml of 0.3 M Fe^{2+} solution. Calculate the potential of a Pt electrode dipping in the solution, relative to NHE. ($E^\circ \text{Fe}^{3+} = 0.77\text{V}$).
d- Calculate the equilibrium concentrations of different species in a 0.1 M fumaric acid, at pH 4.0. ($\text{pK}_{a1} = 3.05$, $\text{pK}_{a2} = 4.5$).
- 2)a- Explain the Mohr titration. This method must be carried out in a neutral solution. Why?
b- What is the electrode potential (vs.NHE) in a solution containing 0.5 M KBrO_3 and 0.25M Br_2 at pH2.0? ($E^\circ \text{BrO}_3^- = 1.52\text{V}$)
c- Chloride in a brine solution is determined by the Volhard method A 10.0 ml aliquot of the solution is treated with 15.0 ml of 0.1182 M AgNO_3 solution. The excess silver nitrate is titrated with 0.101 M KSCN solution, requiring 2.38 ml to reach the red $\text{Fe}(\text{SCN})^{2+}$ end point. Calculate the concentration of chloride in the brine solution, in g/L.
- 3)a- Distinguish between a complexing agent and a chelating agent.
b- Calculate the pCl in a solution obtained by reacting 50 ml each of 0.1 M NaCl and 0.1 M AgNO_3 . [$\text{K}_{sp}(\text{AgCl}) = 1 \times 10^{-10}$].
c- Define the following: i- Chemical factor ii- Peptization iii- Buffer solution.
d- Zinc is determined by precipitating and weighing as $\text{Zn}_2\text{Fe}_2(\text{CN})_6$. What weight of zinc is contained in a sample that gives 0.348 g precipitate?
- 4)a- Write briefly on the theory of acid-base indicators.
b- How many milliliters of 0.5 M NaOH should be added to 10 g of trishydrochloride to give a pH of 7.60 in a final volume of 250ml? ($\text{pK}_a = 8.075$, $\text{FM} = 157.596$).
c- Calculate the pH of a solution that is 0.05 M in Formic acid and 0.10 M in sodium formate. ($\text{K}_a = 1.76 \times 10^{-4}$).
- 5)a- Is the pH at the end point for the titration of a weak acid, with a strong base neutral, alkaline, or acidic. Why?
b- How can you detect systematic error?
c- What is the pH of a solution prepared by dissolving 1.23 g of 2-nitrophenol ($\text{FM} = 139.11$; $\text{K}_a = 6.2 \times 10^{-8}$) in 250 ml?
d- Consider the titration of 25.0 ml of 0.05 M HClO_4 with 0.1 M KOH . Find the pH at the following volumes: 0, 10, 12.5 and 13 ml of base added. Sketch the diagram and select the indicator(s) used.
At.wts. C=12, N=14, O=16, Cl=35.45, Mn=54.94, Fe=55.84, Zn=65.37

"Good Luck"

Examinars: Prof.Dr.Hassan Sedaira, Prof.Dr.Elham Y.Hashem.

Assiut University

Faculty of Science
Chemistry Department

Final Examination for 2nd (Industrial Program)Polymer Chemistry (211 C)



Date: Saturday, 5/01/2019

Time: 2 hours.

Answer Five only from the following Questions:

(50 points)

- 1) a) Explain by equations the Cationic Vinyl polymerization?
b) Mention and draw the types of Copolymers?
- 2) a) " Carbon Fibers..... the wonder polymer..... stronger than the steel". Show by equations the steps of production of this polymer.
b) What is the difference between Cellulose and Starch according to its Monomers?
- 3) Show by equations how can you prepare the following polymers:
i) Polyethyleneterephthalate. ii) Nylon 6,6 iii) Polystyrene
- 4) a) Terephthaloyl chloride + 1,3-propane diols. Show the possibility of step-growth polymerization of these two monomers.
b) What is the HIPS ? draw its structure?
- 5) a) Which of these polymers are: branched, linear or crosslinked: Polyethylene, Polypropylene , Polyisoprene , Polyester, Polystyrene , Polybutadiene , Nylon.
b) Three things that make polymers are different. Discuss?
- 6) a) In the free radical vinyl polymerization, discuss by equations the steps of polymerization ?
b) Show by equations the mechanism of coordination polymerization using Ziegler-Natta catalyst and Ethylene gas.

Good Luck

Examiner:

Prof. Dr. Kamal I Aly

Final Exam for second level Students, Applied Industrial Chemistry Program
Electrochemistry (C209), 1st semester

($F=96485 \text{ C mol}^{-1}$, $R=8.314 \text{ J K}^{-1} \text{ mol}^{-1}$, $A=0.509 (\text{mol kg}^{-1})^{1/2}$)

Answer Only Five from the following questions:

- 1) (i) Consider the cell $\text{Zn (s)} \mid \text{Zn}^{2+} (1 \text{ M}) \parallel \text{H}^+ (x \text{ M}) \mid \text{H}_2 (1 \text{ atm}) \mid \text{Pt (s)}$
If the emf of this cell = 0.54V at 25°C calculate the pH of the unknown acidic solution,
where $E^\circ_{\text{Zn}^{2+}/\text{Zn}} = -0.76\text{V}$. (5 marks)
(ii) Calculate the standard free-energy change at 25°C for the following reaction:
 $\text{Sn(s)} + \text{Cu}^{2+}(\text{aq}) \rightarrow \text{Sn}^{2+}(\text{aq}) + \text{Cu(s)}$, where $E^\circ_{\text{Sn}^{2+}/\text{Sn}} = -0.14\text{V}$, $E^\circ_{\text{Cu}^{2+}/\text{Cu}} = +0.34\text{V}$. (5 marks)
- 2) (i) Explain the types of solid electrolytes. (5 marks)
(ii) Given the following shorthand notation: $\text{Pt(s)} \mid \text{Sn}^{2+}(\text{aq}), \text{Sn}^{4+}(\text{aq}) \parallel \text{Ag}^+(\text{aq}) \mid \text{Ag(s)}$
Write a balance equation for the cell reaction, and give a brief description of the cell. (5 marks)
- 3) (i) Explain the chemical composition and the discharging process of the *mercury* battery. (5 marks)
(ii) What is the reduction potential of silver electrode $\text{Ag, AgCl/(0.1M) KCl}$ at 25°C, where the standard electrode potential = +0.2224 V. (5 marks)
- 4) (i) Find the emf of the cell described by the cell diagram (5 marks)
 $\text{Cd} \mid \text{Cd}^{2+} (0.10 \text{ M}) \parallel \text{Cu}^{2+} (0.550 \text{ M}) \mid \text{Cu}$ (where $E^\circ_{\text{Cu}^{2+}/\text{Cu}} = +0.34\text{V}$, $E^\circ_{\text{Cd}^{2+}/\text{Cd}} = -0.40\text{V}$)
(ii) Derive mathematical form of salt activity (a_{salt}) of the following: NaI , SrBr_2 and $\text{Al(NO}_3)_3$. (5 marks)
- 5) (i) Using the Debye-Hukel limiting law, calculate the value of $\gamma_{\pm}$ in $5 \times 10^{-2} \text{ m}$ solution of $\text{Mg(NO}_3)_2$. (5 marks)
(ii) Complete and balance the following redox equation:
 $\text{PbO}_2 + \text{Cl}^- \rightarrow \text{Pb}^{2+} + \text{Cl}_2$ (basic solution) (5 marks)
- 6) (i) Define the electric double layer and explain its theories. (5 marks)
(ii) The cell potential = 0.417V of the concentration cell
 $\text{Ag} \mid \text{Ag}^+(\text{sat'd AgI}) \parallel \text{Ag}^+(0.10 \text{ M}) \mid \text{Ag(s)}$, calculate K_{sp} of AgI (5 marks)

مع اطيب التمنيات بالتوفيق..

الأستاذ الدكتور / أبو الحجاج عبدالعزيز هرماس

Assiut University

Dec 2018

Faculty of Science

Time: 2h

Chemistry Department

Final examination of "Inorganic Chemistry" course 207C for the 2nd level,

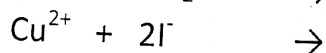
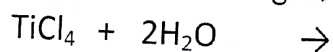
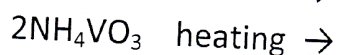
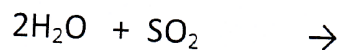
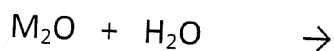
Industrial program

Answer the following (maximum 50 Marks)

1. Give reasons for **EIGHT** of the following (16 Marks)

- i) Solutions of group I metals in ammonia conduct the electricity.
- ii) Solutions of Be salts are acidic (give an equation).
- iii) BaCO_3 is mixed with C to produce BaO by heating.
- iv) Ga has the same radius as Al.
- v) SF_6 is resistant to chemical attack.
- vi) Cr is resistant to corrosion
- vii) $\text{K}_2\text{Cr}_2\text{O}_7$ is used as a primary standard in volumetric analysis.
- viii) When $\text{Mn}(\text{OH})_2$ is precipitated from solutions it rapidly darkens.
- ix) ZnS does not precipitate when H_2S is passed in an acidic solution of Zn(II) while Cd does.

2. Complete **FIVE** of the following equations (10 Marks)



3. Give two methods for metal carbonyls preparation. (3 Marks)

4. Suggest a method for the quantitative preparation of B_2H_6 and then draw its structure. (3 Marks)

5. Write equations illustrating the disproportionation reactions of the following ions: (8 Marks)

Cu^+ , Au^+ , Hg_2^{2+} , MnO_4^{2-} (in acid solution)

انظر ملفه بوقت الإجابة

6. Mark with (✓) for the correct statement and with (X) for the false one (answer only **FIVE**) for the following: (10 Marks)

- i) NO is a diamagnetic compound.
- ii) Ammonium salts of strong acids are slightly acidic.
- iii) Chromium sulphide can be easily precipitated from H_2S solutions.
- iv) Iron (III) carbonate can be prepared from the reaction of an iron salt with sodium carbonate.
- v) The first ionization potential of Cu is lower than that of the alkali metals.
- vi) The nomenclature of $[Ag(CN)_2]^-$ is dicyanosilver(I) ion.

Good Luck

Examinar

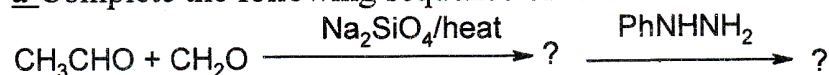
Prof. Dr. Aref A. M. Aly

Final examination in Organic chemistry 211C for non chemistry students (the chemistry of aliphatic compounds and some selected aromatic compounds)

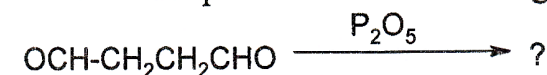
Answer the following questions----- 50 marks

Question 1 Answer five only of the following----- 17.5 marks

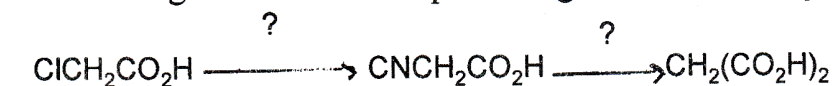
a-Complete the following sequence of reactions



b-Predict the product of the following reaction

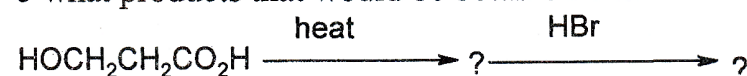


c-What reagents would be required to give the following transformations



d-Reaction of $\text{MeCOCH}_2\text{COOEt}$ in EtONa/EtOH with $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$ followed by acid hydrolysis

e-what products that would be obtained from the following reactions



f-Reaction of $\text{CH}_3\text{CH}_2\text{CH}_3$ with Cl_2/heat or light

Question 2 Answer five only of the following----- 17.5 marks

a-Predict the major product and the mechanism of the following reaction
 alc.KOH/heat



-b-Predict the major product that results when $(\text{CH}_3)_3\text{C-Br}$ is reacted with MeOH and give a mechanism

c-Give the product of the reaction $\text{CF}_3\text{-CH=CH}_2$ with HCl

d-Synthesis of Succinic anhydride from Diethyl malonate

e-Reaction of primary, secondary, tertiary aromatic amines with HNO_2

f-by equations convert bromobenzene to 3-nitrobenzoic acid

Question 3 Answer five only of the following----- 15 marks

a- Reaction of benzene with I-Cl/AlCl_3 and give a mechanism

b- Ethylamine is more basic than aniline----- Give the reason

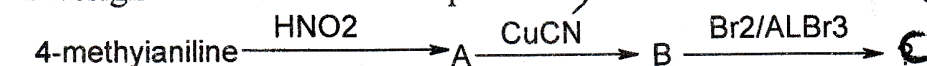
c- Predict the nitration product of the following i-4-chlorotoluene ii-acetanilide

d- Benzene reacts with $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl/AlCl}_3$ to yield two isomeric alkyl

Benzenes. predict their structures and propose a mechanism

e-Preparation of 3-bromophenol from benzene

f-Assign the structure of compound A, B and C in the following reactions



GOOD LUCK

Prof. Dr. Sh. M. Radwan

Sh. M. Radwan



Final exam in 210 C course for second level's students

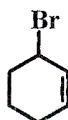
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Answer the following questions:Part 1(Reaction Mechanism).....(25 marks).

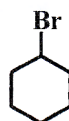
1. Chose the correct answer for the following questions:

(8 marks).

- 1) Which of the following compound is the more stable alkene:
a. $\text{CH}_3\text{CH}=\text{C}(\text{CH}_3)_2$, b. $\text{CH}_3\text{CH}=\text{CHC}(\text{CH}_3)_3$, c. $\text{CH}_3\text{CH}=\text{CHCH}_3$
- 2) Which of the following compound is classified as a vinylic halide:
a. $\text{PhCH}=\text{CBrCH}_3$, b. $\text{PhCH}=\text{CHCH}_2\text{Br}$, c. $\text{PhCBr}=\text{CHCH}_3$
- 3) The compound $\text{PhCH}_2\text{CH}_2\text{Cl}$ reacts with $\text{CH}_3\text{COONa/DMSO}$ via :
a. $\text{S}_{\text{N}}1$, b. $\text{S}_{\text{N}}2$, c. $\text{E}2$, d. $\text{E}1$
- 4) Which of the following compound is better nucleophil
a. CH_3S^- , b. CH_3O^- , c. HS^- , d. HO^-
- 5) Which halide would react fastest in aqueous ethanol (solvolysis)
a. $(\text{CH}_3)_3\text{C-I}$, b. $(\text{CH}_3)_3\text{C-Br}$, c. $(\text{CH}_3)_3\text{C-Cl}$
- 6) Which of the following compounds or ions act as acid or base ?
a. $(\text{CH}_3)_2\text{N}^+\text{H}$, b. $(\text{CH}_3)_2\text{NH}$, c. $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$, d. $\text{CH}_3\text{CH}_2\text{O}^-$
- 7) Which alkyl halide of the following reacts with CH_3O^- via $\text{S}_{\text{N}}2$ reaction
a. (R)-2-bromobutane, b. (R)-2-bromo-2-methylbutane, c. (S)-2-bromo-2-methylbutane
- 8) which of the following reacts faster via $\text{S}_{\text{N}}1$ reaction



A



B

II. Write an equations , mechanism , name of products and type of selectivity for: (10 marks).

1. The $\text{S}_{\text{N}}2$ reaction of S-2-bromobutane with CN^- and then designate the configuration of the product by (R) or (S) system
2. The reaction of 1-methylcyclohexene with $\text{H}_2\text{O/H}_2\text{SO}_4$ and then name the reaction
3. The $\text{E}2$ reaction of trans-1-chloro-2-methyl cyclohexane in aqueous NaOH
4. the solvolysis in water of $\text{PhCH}=\text{CH}_2\text{CH}_2\text{Cl}$ and draw the energy diagram of this reaction
5. the hydrolysis of $(\text{CH}_3)_2\text{C}=\text{CH-CH}_2\text{Cl}$ using NaOH

III. 1. What is the effect on the rate of the $\text{S}_{\text{N}}2$ reaction of CH_3I and HO^- when:..... (7 marks).

- a. The concentration of CH_3I is tripled
- b. The concentration of HO^- is doubled
- c. The ratio of the solvent to reactants is doubled
2. Methyl amine undergoes a Lewis acid-base reaction with BF_3 :
a. Write the equation for this reaction
b. Show which of them Lewis acid and which is Lewis base
3. List the following compounds in order of increasing basicity:
a. NH_3 , b. CH_3NH_2 , c. $(\text{CH}_3)_2\text{NH}$
4. Draw all resonance structures of $\text{CH}_3\text{COCH}=\text{CH}_2$. Explain your answer using curved arrows.
5. Write chemical equations for the homolytic cleavage or the heterolytic cleavage of each of the following compounds at the indicated bond. Explain your answer and show by curved arrows the movement of electrons.
a. H-NH_2 , b. $\text{CH}_3\text{-OH}$, c. H-OH

Good Luck

Prof. Dr. Adel M. Kamal El-Dean

Prof. Dr. Omima S. Mohamed

انظر خلفه

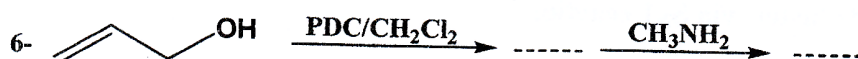
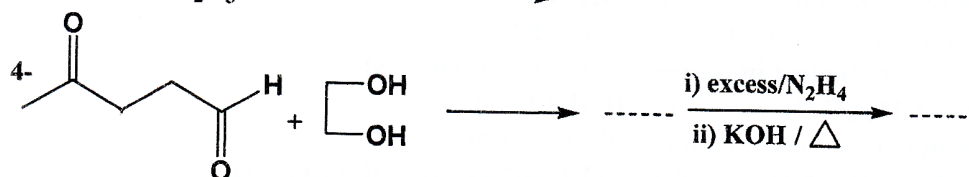
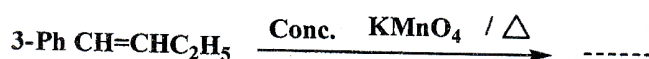
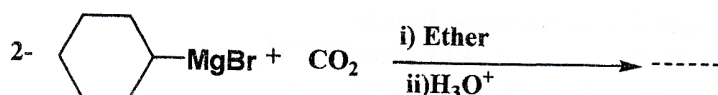
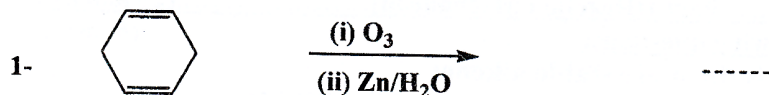
Part 2(Carbonyl Compounds)

(25 Mark)

Question No. Three:

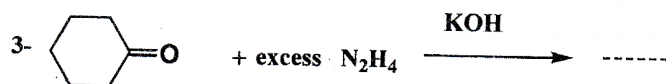
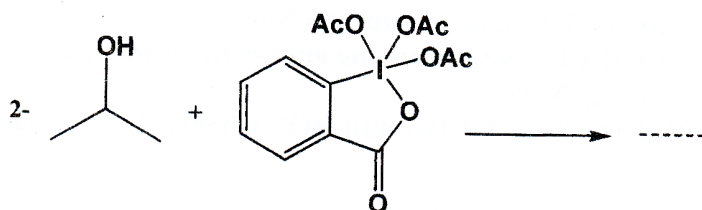
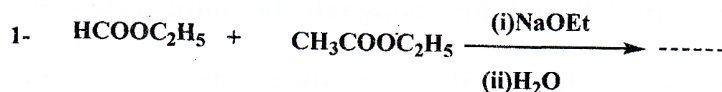
a) Complete Five Only for the following equations:-

(5 Marks)



b) Explain by equation Two Only of the following reactions and then discuss the *mechanism*, name the products and name of reaction .

(4 Marks)



c) What is the meaning Three Only of the following abbreviations giving their chemical structures

(3 Marks)

1-DMF

2-PCC

3-DMSO

4-DIBAL-H

Question No. Four

a) Starting with ethyl aceto acetate or diethyl malonate show by equations ,how to synthesis Two Only of the following:- (4 Marks)

i) 2-Pentanone

ii) 2-Methylbutanoic

iii) 4-Phenyl-2-butanone

b) Mark Five Only (✓) for the right statments and (x) for the wrong one: (5 Marks)

1-Oxidation of 1^0 and 2^0 alcohols promoted by $(\text{COCl})_2$ /DMSO called Swern oxidation .

2-Acetals are gem.diether derivatives of RCHO or R_2CO , formed by reaction with two equivalent of an $\text{R}'\text{OH}$ and elimination of water.

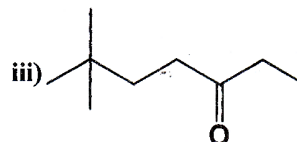
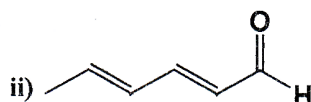
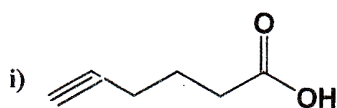
3-Carboxylic acids are less acidic than alcohols because the carboxylate anion is less stable than the alkoxide anion.

4-the mechanism of imine formation starts with the basic addition of the amine to carbonyl group.

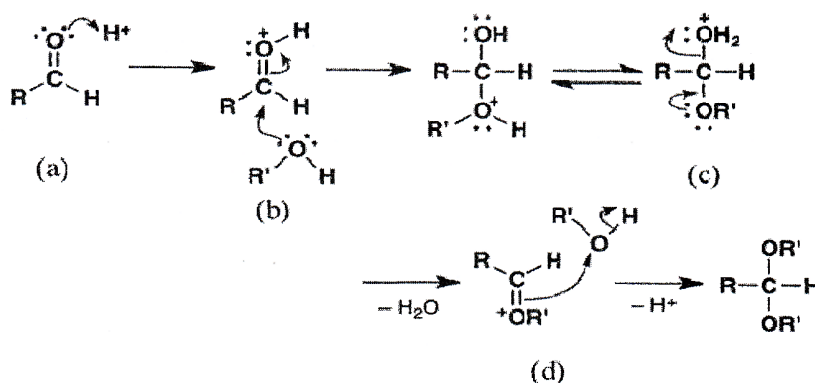
5-Dithiane has relatively acidic hydrogen located between two $\text{C}=\text{O}$ groups, and these can be removed by a strong base.

6-The mechanism of Fischer esterification involve three stages one of them formation of tetrahedral intermediate.

c) Write the IUPAC name for Two Only of the following (2 Mark)



d) Which stage of the following reaction scheme for acetal formation does not correctly, show the flow of electrons. (2 Mark)



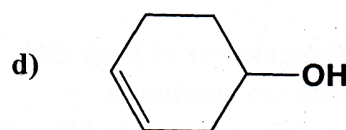
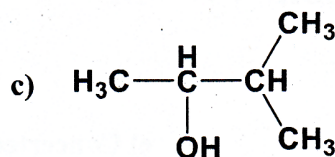
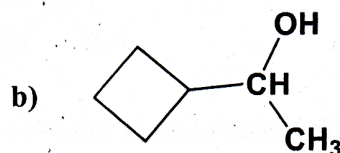
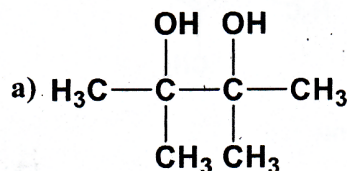
Good Luck

الممتحنين: ا.د. عادل كمال - ا.د. زينب حزين - ا.د. اميمه سعد - د. عوض ابراهيم

Final Examination of Organic Chemistry (201C) for 2nd Level Students
Industrial Chemistry

Answer the following questions:

First Question: Give the reaction mechanism and the major product that is formed when each of the following alcohols is heated in presence of H_2SO_4 , Three Only (9 Marks)



Second Question:

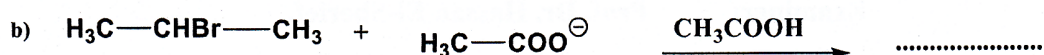
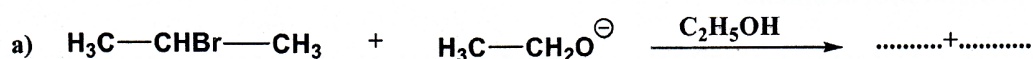
i) What are the products obtained from the reaction of 3-methyl-1-butene with the following reagents, Three Only. (9 Marks)

a) Bromine in CCl_4
c) HBr

b) Bromine in H_2O
d) HBr/Peroxide

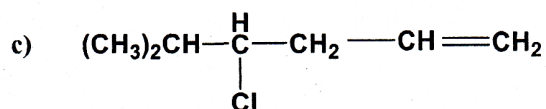
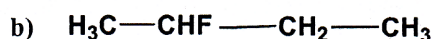
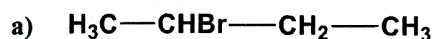
ii) Suggest a reaction mechanism for Only Two of the above reactions (6 Marks)

Third Question: Give the products of the following reactions: (6 Marks)



Fourth Question:

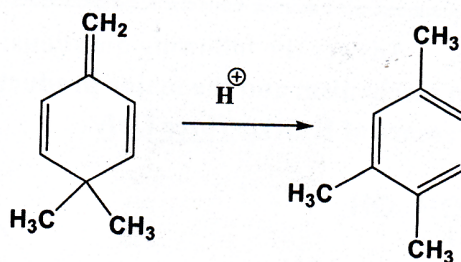
Give the major elimination product obtained from an E2 reaction of each of the following alkyl halides with hydroxide ion. (6 Marks)



Fifth Question:

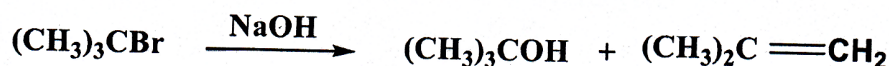
i) Propose a mechanism for the following reaction.

(4 Marks)



ii) Suggest a reaction mechanism of the following reaction

(6 Marks)



iii) Choose the correct answer of Four Only the following:

(4 Marks)

- 1) An E1 elimination reaction is
 - a) One step
 - b) More than one step
 - c) Concerted
 - d) First order
 - e) Second order
 - f) b and c
 - g) b and d
 - h) b and e
 - i) a and c
- 2) One of the following compounds does not undergo SN_1 or SN_2 reaction, what is it?
 - a) $CH_2=CH-CH_2Br$
 - b) CH_3CH_2Br
 - c) $CH_2=CH-Br$
 - d) $(CH_3)_3CBr$
- 3) Addition of HCN to aldehydes is:
 - a) Electrophilic addition
 - b) Free radical additions
 - c) Nucleophilic addition
- 4) The following reactions are accompanied by rearrangement
 - a) E1
 - b) E2
 - c) SN_1
 - d) SN_2
 - e) a and b
 - f) a and c
 - g) b and c
- 5) Carbocations reacted by the following reactions except
 - a) Accept a nucleophile
 - b) Accept a proton to form alkene
 - c) Rearrangement
 - d) Loss a proton to form alkene

Examiner:

Prof. Dr. Hassan El-Sherief.

Physical Chemistry Examination (C-203) for Second Level Students

Answer the following questions:

1) Answer Three Only from the following: (16.5 Marks)

- a) Derive the kinetic equation for determination the specific rate constant for the following reaction: $A+B \xrightarrow{K_2} \text{products}$
- b) Discuss the effect of temperature on the reaction velocity.
- c) Explain the half life method for determination the reaction order.
- d) The decomposition of a chemical compound has the rate constant $=2.46 \times 10^{-5}$ at 273 K° and 163×10^{-5} at 303 K° . Find the value of ΔE^* ($R=1.987$).

2) Answer Three Only from the following: (16.5 Marks)

- a) Discuss the different kinetic equations for a bimolecular catalytic and homogeneous reaction.
- b) Formulate the main postulations given by Shpitalsky for the theory of homogeneous catalysis and show how it can be applied for the catalytic decomposition of H_2O_2 in presence of molybdate anion catalyst.
- c) Write short note on the following:
- i- Selectivity in heterogeneous catalysis.
 - ii- Mixed catalysts.
 - iii- Relation between ionic strength and reaction rate.
 - iv- Steps of heterogeneous catalytic reaction, and Fick's law of diffusion.
- d) Discuss the dualistic theory of catalysis and show how the experimental conditions can be adjusted to compute the individual rate constant?

3) Answer Three Only from the following: (17 Marks)

- a) Calculate the lattice constant for rock salt of $d=2220 \text{ kg/m}^3$, assuming that it has fcc lattice (At.wt of : $\text{Na}=23$, $\text{Cl}=35.5$)
- b) Discuss the characteristics of the different systems having the three dimensional lattice symmetry.
- c) " In ideally ionic crystal structures , the coordination numbers of the ions are determined by electrostatic considerations". Discuss this statement with special reference to:
- i- The radius ratio rule.
 - ii- The lattice energy of ionic crystals.
- d) Write short notes of the following
- i- APF for bcc structures.
 - ii- Colour centres in NaCl.
 - iii- Dislocations in solids.
 - iv) Solid electrolytes.
-



Final Exam. of Physical and Inorganic Chemistry (250 CH)
Section I (Inorganic Chemistry) (25 Mark)

Answer the following questions:

- 1) a) Explain the reasons for **Five only** from the following:
- i) Concentrated solution of HF acid is not kept in glass bottle.
 - ii) CO_2 is an acidic Oxide
 - iii) Cesium ions conduct electricity more than lithium ions.
 - iv) Na_2CO_3 is soluble in water but CaCO_3 is not.
 - v) KO_2 is used in space capsules.
 - vi) NH_3 is quite poisonous.
- b) How you can prepare **(Three only)** from the following:
 H_2 , NH_3 , HI , Na .
- c) In each pairs of acids, state which is stronger and why?
 HF and HBr , HClO and HIO , H_3PO_3 and H_3PO_4 .
- 2) a) Choose the correct answer and comment:
- i) Which solution of the following reagents gives a precipitate when CO_2 is bubbled into it (KOH , NaOH , $\text{Ba}(\text{OH})_2$).
 - ii) Which one of the following species contains an odd number of electrons: (CO , NH_4^+ , NO)
 - iii) The compound which contains hydrogen bond (CH_4 , H_2S , H_2O).
 - iv) The species which contains paramagnetic properties is (NO , O_2 , N_2)
- b) How does diborane react with ammonia
- c) Give three examples of Freon's and how do they damage the environment?

See the Next Page

Answer the following questions:(Mark: 25)

I) Choose the correct answer:

1. At constant T, P: $dG = \dots$ a) $dq + dq_{rev}$ b) ΔH c) $dq - dq_{rev}$, d) 0.0 .2. If the V is keeping constant, then $\Delta H = \dots$ a) $\Delta F^\#$ b) q_v c) $\Delta H^\#$ d) q_p For reversible processing: $q_{irrev} = \dots$ a) $\Delta F^\#$, b) $\Delta G^\#$ c) q_{rev} 3. $\Delta H = \Delta E + \dots$ a) $\Delta F^\#$, b) ΔR , c) $\Delta(PV)$, d) ΔC_p 4. If $\Delta H^\#$ and Q_p are negative, the reaction will be:

5. a) irreversible b) endothermic c) reversible d) exothermic

II) Complete the Following:

1) Under isothermal expansion of ideal gas: $\Delta S^\# = \dots$

2) $\frac{dH}{dT} = \frac{\dots}{\dots} + \frac{\dots}{\dots}$

3) $\Delta G^\# - \Delta G^{\#0} = \dots$

4) $C_p = \dots + \dots$

5) $\frac{d \ln K}{dT} = \frac{\dots}{\dots}$

III -a) Show, how can you calculate the work done (W) in each operation,maximum work (W_{max}), and efficiency (η) during Carnot cycleb) Tabulate the conditions for $\eta\% = -100, -50, 0.00, +50, +100$, and ∞ IV) Prove that the equilibrium constant (K) for the chemical reactionis affected by the change in temperature (T): $aA + bB \xrightleftharpoons{K} cC + dD$ V) When gaseous of Ozone (O_3) is formed from the molecular oxygen bythe reaction: $3O_{2(g)} \longleftrightarrow 2O_{3(g)}$ if $\Delta G^{\#0} = +39.1 \text{ kcal.mol}^{-1}$, $R = 1.98 \text{ cal / mo.deg}$ What is the value of K for this reaction at: $t = 0.0, 27, 47$, and 67°C

-----Good Luck-----

Examiners: 1) Prof. Dr. Amna S A Zedan,

2) Prof. Dr. Seddique M Ahmed

First Semester Final Examination Inorganic Chemistry (C - 220)
Subject : Inorganic Chemistry (C – 220)

I- Answer the following questions : (50 Marks)

1) Compare between the following (10 Marks)

- a- Graphite and diamond (regarding structure and electrical conductivity).
- b- Water gas and producer gas (regarding composition and production).
- c- The acidity of HOCl and HClO₄.
- d- Temporary and permanent hardness of water (regarding constituents and how can be removed).

II- Answer Only four of the following :

1) Write the reason (s) for the following: (10 Marks)

- a- Fluorine is the most reactive element in the periodic table.
- b- Oxidation state of carbon is limited to four.
- c- The noble gases form clathrate compounds.
- d- The hydration energies of group (II) ions are four or five times greater than that of group (I) ions.

2) Using the chemical equations clarify the following chemical process: (10 Marks)

- a- Freon causes damage to the ozone layer.
- b- H₂O₂ can behave as both an oxidizing and reducing agent.
- c- Boric acid acts as a strong acid in the presence of glycerol.
- d- K₂O is used in space capsules and submarines.

3) Answer the following:

a) Complete the following statements: (10 Marks)

- i- CO is toxic for human beings due to
- ii- Factors influencing complex formation are 1.....2.....3.....

b) Write the names of group VII (halogens) elements as well as their electronic configurations and the possible oxidation states of each element.

4) Give a method for obtaining the following (10 Marks)

- i- Boron sesquioxide ii. Ozone iii. Urea iv. Hydrazine

5) Complete the following : (10 Marks)

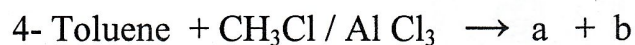
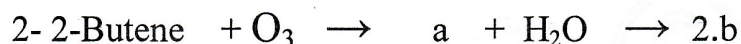
- i- $\text{BaO}_2 + \text{H}_2\text{SO}_4 \rightarrow \dots + \dots$
- ii- $2\text{XeF}_2 + 2\text{H}_2\text{O} \rightarrow \dots + \dots + \dots$
- iii- $\text{Li}_3\text{N} + 3\text{H}_2\text{O} \rightarrow \dots + \dots$
- iv- $\text{HCOOH} + \text{H}_2\text{SO}_4 \rightarrow \dots + \dots$

"Good Luck "

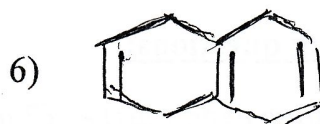
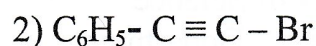
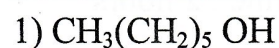
Examiners

Prof Dr Ahmed Hassan Othman
Prof Dr Dina M. Fouad

4)- A- complete the following equations (Four only)----- (20 marks)



B- Write the name of the following compounds .



C- Draw the structural formula of the following compounds:

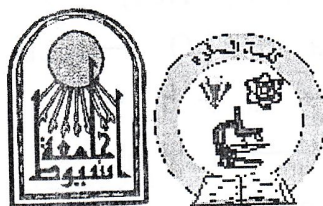
cyclooctatetraene * Gamexane * N-bromosuccinimide

sodium salicylate * o-cresole * Benzonitrile

Good Luck

Prof. Dr Osama Shehata Moustafa

Aug. 2018



Assiut University
Faculty of Science
Chemistry Department

Aug. 2018
Time : 2 hours

Final Exam. for (211C) (Student not Chemistry , Summery Term)

Write the name of all compounds.

Answer for the following questions:

1) A- What mining by (give examples):- (7 only)----- (10 marks):

- | | | | |
|---------------------|---------------------|-------------------|---------|
| 1- Quinone. | 2- Anilide | 3- Hydrazone. | 4- Neo. |
| 5- Ter. (3°) amine. | 6- Markonikov- rule | 7- Amide / Emide. | |
| 8- T.N.B | 9- T.F.A | 10- D.M.F. | |

B- Compound (A) its molecular formula (C_4H_6BrCl). Draw the Geometrical isomers (Cis /Trans) of this compound.

2) A-Give examples for the following reactions (Four only)--(10 marks):

- | | |
|--|-----------------------------|
| 1- polymerisation reaction. | 2- Re-arrangement reaction. |
| 3- Gabriel reaction to prepare methyl amine. | 4- Cainzaro reaction. |
| 5- Elimination reaction of propyl chloride. | |

B- Write one method to prepare the following compounds (Three only):
Saccharin * Benzoic acid * *p*- bromoaniline * Iodoform.

3) A- How do you convert : (Two only)----- (10 marks):

- | | |
|--|--|
| 1- Acetaldehyde $\rightarrow$ Sec.(2°) alchol by Grinuard reagent. | |
| 2- Tolune $\rightarrow$ Benzene. | 3- Salicylic acid $\rightarrow$ Phenol |
| 4- Benzene $\rightarrow$ Glcozal | |

B-Write on Two only:

- | | |
|--|------------------------|
| 1- Vohils method to convert aldohexose to aldopentose. | |
| 2- Stereoisomers of Carbohydrate. | 3- Phthaline reaction. |
| 4- Addition of conc. H_2SO_4 to 1- pentene. | |

***** أنظر خلفه *****